

Oral Contributions

[MS32] Structural studies at extreme conditions by single crystal X-ray diffraction

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[MS32- 01] Single Crystal Diffraction at Extreme Conditions on Synchrotron Sources Malcolm McMahon

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By the end of the 1990s, it was clear that the structural behaviour of matter at high pressures was very much more complex than previously believed. Indeed, much of the complexity was such that only single-crystal diffraction techniques are capable of resolving the structural details. By utilising the extremely high intensity, short wavelengths and micro-focussing available on 3rd generation synchrotron sources such as the ESRF and Petra-III, it is now possible to determine crystal structures to pressures in excess of 150 GPa, and to make highly-detailed studies of thermal motion and disorder. In this talk I will describe the use of single-crystal techniques, utilising both high- and poor-quality single crystals, to unravel the phase transition behaviour in elemental potassium between 20 and 60 GPa. At 300K, we observe a series of transition between complex incommensurate forms, while at higher temperatures we observe partial melting of the structure.

Keywords: high-pressure crystallography, synchrotron radiation, crystal structure determination